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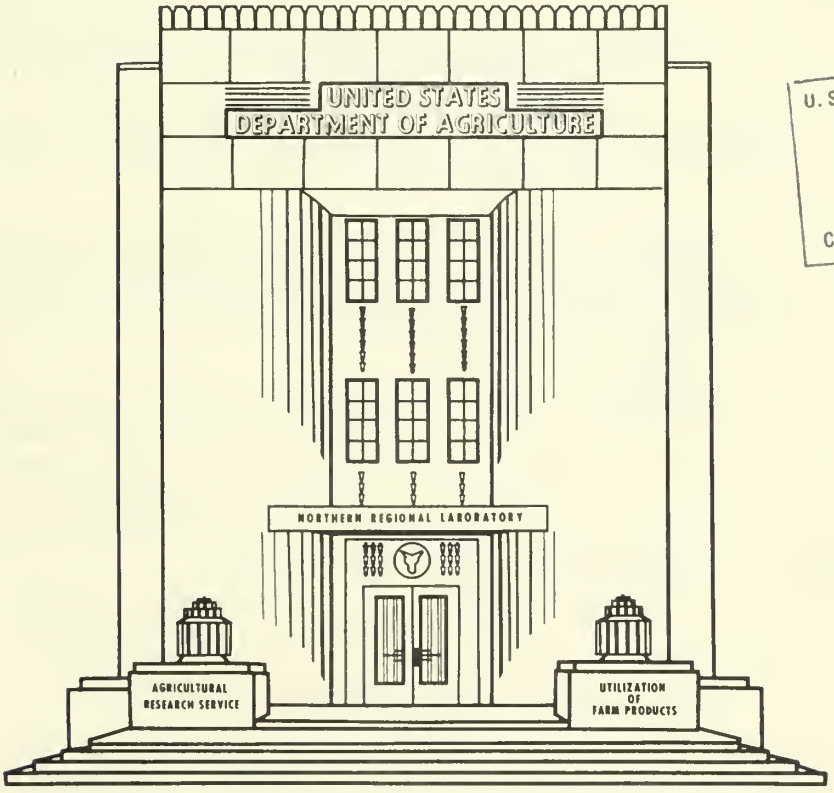
PUBLICATIONS AND PATENTS

of the

NORTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION

Peoria, Illinois, for the period

JULY - DECEMBER 1961



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Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Congress in 1938 authorized four regional laboratories to conduct basic and applied research designed to expand, improve and develop through science and technology the utilization of American farm crops. Agricultural products assigned the Northern Division are: The cereal grains--corn, wheat, barley, grain sorghum, and oats; the oilseeds--soybean, flaxseed, safflower, and erucic acid-containing oilseeds; and new crops. The abstracts in this list describe current research on these commodities and indicate progress achieved by the Northern Division.

Northern Division publications are available, in conformance with the policy of the Department of Agriculture, to scientists and other specialists, librarians, representatives of the press, and others interested. Titles of publications no longer available are marked with an asterisk (*).

Requests for specific reprints should be addressed to: Northern Utilization Research and Development Division, 1815 North University, Peoria, Illinois. Mailing lists are not maintained except for the list of Publications and Patents.

Most of the publications are reprints of articles published in journals that are available in libraries. Any one who needs information may obtain it most efficiently by consulting a technical library. Photographic copies of most journal articles on research at this Division can be purchased from the Library of the U.S. Department of Agriculture, Washington 25, D.C.

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Printed copies of patents, which are assigned to the Secretary of Agriculture, can be obtained only by purchase (25 cents each) from the Commissioner of Patents, U.S. Patent Office, Washington 25, D.C. Order by number, do not send stamps.

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PUBLICATIONS

[Publications marked (*) are not available for distribution. When requesting reprints, please order by number.]

1262 MISO. II. FERMENTATION.
K. Shibasaki and C. W. Hesseltine.
"Developments in Industrial Microbiology," vol. 2, pp. 205-214. New York. 1961. Proc. 17th Gen. Meeting Soc. Ind. Microbiol., Stillwater, Oklahoma, August 28-September 1, 1960.

Miso is a food prepared from cooked soybeans to which a koji (molded rice) and salt have been added, followed by enzyme action, fermentation, and ripening. Studies were made on the comparative fermentations of American and oriental soybean varieties prepared by varying the soaking, cooking, and fermentation times. A method was developed whereby miso can be prepared from mixed U.S. soybean varieties in which the seedcoats are removed and the grits are fermented. If grits are used, it is possible to reduce the soaking, cooking, and fermentation times greatly. A typical pilot-plant run based on a 17-kilogram fermentation is described.

1261 PLANT DISEASE ANTIBIOTICS.
Thomas G. Pridham.
"Developments in Industrial Microbiology," vol. 2, pp. 141-153. New York. 1961. Symposium on Nonmedical Aspects of Antibiotics, Proc. 17th Gen. Meeting Soc. Ind. Microbiol., Stillwater, Oklahoma, August 28-September 1, 1960.

A considerable time has elapsed since concerted efforts were begun in the United States to discover and develop antibiotics for control of plant diseases. General interest in the area of nonmedical application of antibiotics continues despite the fact that few formulations have reached the marketing stage. A number of experimental materials still are under test. During the past 6 years the Northern Division in cooperation with the Crops Research Division has participated in a joint laboratory and greenhouse screening program.

A brief review of the present status of plant disease antibiotics, techniques used in screening programs, translocation studies, and results obtained in the combined laboratory and greenhouse testing program is given. Our experience suggests the need for laboratory tests that more quickly and accurately anticipate the results obtained in field trials. It appears also that antibiotics offer the most promise as systemic materials. Selection of this type of antibiotic poses a number of problems which will be discussed.

1263 AMINO ACID COMPOSITION OF PROTEINS IN WHEAT GLUTEN.
J. H. Woychik, J. A. Boundy, and R. J. Dimler.
J. Agr. Food Chem. 9(4): 307-310. July-August 1961.

The amino acid composition of whole gluten and of six protein fractions, corresponding to electrophoretic components previously demonstrated in whole gluten, has been determined by ion-exchange chromatography. Although the overall amino acid pattern of these proteins is similar, significant differences in composition indicate the individuality of the isolated gluten components. A water-soluble protein isolated from the gluten preparation was tentatively identified as wheat albumins and/or globulins on the basis of amino acid composition.

1268 ANALYSIS OF FAT ACID OXIDATION PRODUCTS BY COUNTERCURRENT DISTRIBUTION METHODS. V. LOW-TEMPERATURE DECOMPOSITION OF METHYL LINOLEATE HYDROPEROXIDE.
A. E. Johnston, K. T. Zilch, E. Selke, and H. J. Dutton.
J. Am. Oil Chemists' Soc. 38(7): 367-371. July 1961.

Methyl cis,trans diene conjugated linoleate hydroperoxide was stored in oxygen and in nitrogen at 4° C., and changes in gas volume, spectral absorption, molecular weight, peroxide value, and countercurrent distribution patterns were studied.

1174 ELECTROPHORETIC COMPOSITION AND INTRINSIC VISCOSITY OF GLUTENS FROM DIFFERENT VARIETIES OF WHEAT.
J. E. Cluskey, N. W. Taylor, Helen Charley, and F. R. Senti.
Cereal Chem. 38(4): 325-335. July 1961.

The protein compositions of hard and soft wheat flours were compared by electrophoresis of the gluten and water-soluble constituents fractionated from selected samples of the defatted flours. Although the amount of total protein was higher in the hard wheat than in the soft wheat flours, the amount of water-solubles, as recovered from gluten washing, was essentially the same. The reported differences in the amounts of the electrophoretic components in the gluten proteins were small but statistically significant. Purified gluten fractions from the hard wheats exhibited the greater intrinsic viscosities. This difference probably reflects the higher alpha content in the hard wheat class.

1298 IMPROVED GLASS-PLATE HEATER FOR PAPER CHROMATOGRAPHY.
Lee D. Ough,[1] Allene Jeanes, and J. E. Pittsley. ([1]Clinton Corn Processing Company, Clinton, Iowa.)
J. Chromatog. 6(1): 80-84. July 1961.

Improvements in design and construction are described of a simple, compact, glass-plate heater for bringing out color spots on paper chromatograms after treatment with reagents. Either paper sheets or strips are inserted into the heater on a versatile frame and remain clearly visible during heating. The entire chromatogram is heated uniformly at accurately controlled temperature for an optimal length of time.

1273 IRREVERSIBLE INSOLUBILIZATION OF CASEIN BY DIALDEHYDE STARCH.
F. B. Weakley, C. L. Mehltretter, and C. E. Rist.
TAPPI 44(7): 456-459. July 1961.

Casein has been crosslinked by dialdehyde starch under various conditions to form irreversibly insoluble products. Viscosity control of the aqueous reaction mixtures was achieved by appropriate combinations of reagents and by adjustment of pH. Rapid reaction and gelation occurred at pH levels above 7. An anticipated application of casein-dialdehyde starch is as an adhesive to prepare water-resistant paper coatings.

1266 LIQUID C-18 SATURATED ACIDS DERIVED FROM LINSEED OIL.
J. P. Friedrich, H. M. Teeter, J. C. Cowan, and G. E. McManis.
J. Am. Oil Chemists' Soc. 38(7): 329-332. July 1961.

Liquid C-18 saturated monocarboxylic acids that fail to crystallize at -70° C. have been prepared from linseed oil, linolenic acid, and tung oil. Heating one part of linseed oil in three parts of glycol (weight-volume ratio) at 295° C. for 1 hour with 25% excess sodium hydroxide, followed by distillation and hydrogenation of the resulting free fatty acid monomers and separation of the straight-chain components by low-temperature crystallization from acetone, yielded these liquid acids.

The relative proportions of cyclic acids, straight-chain monomeric acids, and polymer varied with the type of starting material and with the conditions employed. Cyclic acids in excess of 30% yields were obtained from linseed oil. Some hydroxylation of the fatty acids apparently takes place during cyclization; the amount increases with ascending temperatures, as evidenced by a rise in polyester content of the polymer fraction.

Evidence indicates that the bulk of the unhydrogenated cyclic acids are vicinal disubstituted cyclohexadienes. Gas chromatography of the cyclic acids hydrogenated to an iodine value <1 shows that there are several components. These have not as yet been separated and positively identified.

1264 MISO--I. PREPARATION OF SOYBEANS FOR FERMENTATION.
K. Shibasaki and C. W. Hesseltine.
J. Biochem. Microbiol. Technol. Eng. 3(2): 161-174. July 1961.

The preparation of soybeans for fermentation is a very important part of the process for making miso, a traditional Japanese food. In general, soybeans from the United States are smaller and more pigmented than Japanese soybeans. Twenty-eight American varieties, four Japanese varieties, and one Chinese variety have been studied with respect to absorption of water and cooking. A variety of soaking and cooking conditions have been investigated. Some U.S. varieties absorb water and cook very unevenly. Unevenness in cooking is not associated with the size of the beans within a variety.

1272 NEWSPRINT FROM DOMESTIC TIMBER BAMBOO--PHYLLOSTACHYS BAMBUSOIDES.
T. R. Naffziger, T. F. Clark, and I. A. Wolff.
TAPPI 44(7): 472-475. July 1961.

Pulps from Phyllostachys bambusoides for possible use in newsprint-grade papers were prepared experimentally by chemical, semichemical, and mechanical processes. Yields of 82% for cold soda semichemical and 62% for neutral sulphite pulps were realized. Strength characteristics of experimental newsprint from a furnish comprising 80% cold soda and 20% neutral sulphite pulps plus 1% alum, 0.5% rosin, and 7% clay were comparable to those of a control paper from a similar furnish of 80% aspen groundwood and 20% softwood sulphite pulps. Blends of bamboo and wood pulps gave sheets having inferior strength properties in all combinations tried.

1267 OZONIZATION OF SOYBEAN OIL. THE PREPARATION AND SOME PROPERTIES OF ALDEHYDE OILS.
E. H. Pryde, D. E. Anders, H. M. Teeter, and J. C. Cowan.
J. Am. Oil Chemists' Soc. 38(7): 375-379. July 1961.

A polyaldehydic product called aldehyde oil was prepared by the ozonization of soybean oil, followed by reductive decomposition of the ozonolysis products. Reductive decomposition by chemical means gave 85-90% yields of carbonyl in the aldehyde oil. Catalytic reduction gave 75-80% yields. Partially hydrogenated soybean oil gave more efficient results than did unhydrogenated oil. The polyfunctional aldehyde oil undergoes condensation reactions with phenolic compounds, urea, amines, and polyols to give crosslinked polymers.

1278 PRODUCTION OF EXTRACELLULAR AND TOTAL INVERTASE BY CANDIDA UTILIS, SACCHAROMYCES CEREVISIAE, AND OTHER YEASTS.
Robert G. Dworschack and Lynferd J. Wickerham.
Appl. Microbiol. 9(4): 291-294. July 1961.

Some strains of Candida utilis, Saccharomyces carlsbergensis, and Saccharomyces cerevisiae produce exceptionally large amounts of extracellular and total invertase. Strain Y-900 of C. utilis produces high yields whether the carbon source is sucrose, glucose, maltose, or xylose and still higher yields with lactic acid, glycerol, and ethyl alcohol. Approximately 20-30% of the total invertase of C. utilis is extracellular.

1280 A SEARCH FOR NEW FIBER CROPS. PART IV. KENAF COMPOSITION.
H. J. Nieschlag, G. H. Nelson, and I. A. Wolff.
TAPPI 44(7): 515-516. July 1961.

The compositional characteristics of kenaf (Hibiscus cannabinus), a tall, fast-growing annual plant adapted to many areas of the United States, indicate that it merits consideration as a source of pulp fiber.

1179 CAROTENOIDS IN THE FUNGI MUCORALES. SPECIAL REFERENCE TO CHOANEPHORACEAE.
U.S. Dept. Agr., Tech. Bul. 1245, 33 pp., August 1961.

In this review of all the information on carotenoids in the order Mucorales, β-carotene is the most common yellow-orange pigment found; undoubtedly, further study of additional genera and species will not alter this finding. Beta-carotene plays a significant role in sexual reproduction in this group of fungi. From data available it may be commercially feasible to manufacture β-carotene from fungi, especially from the genera Choanephora and Blakeslea, by the use of opposite mating types when combined under appropriate conditions of nutrients, temperature, and selected strains. Since the family Choanephoraceae shows the most promise as a source of β-carotene from fermentation, this family is reviewed in detail especially in reference to their physiology and distribution.

1281 DETERMINATION OF MICRO QUANTITIES OF RUBBER BY A MODIFIED BROMINATION METHOD.
Thomas I. Baker, Lawrence G. Jayko, Robert D. Stubblefield, and Ralph F. Anderson.
Anal. Biochem. 2(4): 287-291. August 1961.

A convenient method to determine small quantities of rubber in microorganisms has been developed. A modification of the bromination method described by Gowans and Clark (Anal. Chem. 24: 529. 1952) made possible the rapid and accurate determination of from 0.2 to 10 mg. of polyisoprene.

1277 LESQUEROLIC ACID. A NEW HYDROXY ACID FROM LESQUERELLA SEED OIL.
C. R. Smith, Jr., T. L. Wilson, T. K. Miwa, H. Zobel, R. L. Lohmar, and I. A. Wolff.
J. Org. Chem. 26(8): 2903-2905. August 1961.

A major constituent of Lesquerella lasiocarpa seed oil is characterized as (+)-14-hydroxy-cis-11-eicosenoic acid. For convenience, it is called lesquerolic acid.

1286 LIST OF PUBLICATIONS AND PATENTS PULPING, PAPERS AND RELATED SUBJECTS.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr. ARS-71-9, Suppl. 1, August 1961. 2 pp. (Processed).

1295 THE METABOLISM OF RIBOSE 5-PHOSPHATE BY CELL-FREE EXTRACTS OF LACTARIUS TORMINOSUS.
H. P. Meloche, Jr.
Biochim. Biophys. Acta 51(3): 586-588. August 1961.

Cell-free extracts of Lactarius torminosus NRRL 2900 were incubated with ribose 5-phosphate, and evidence for the formation of ribulose 5-phosphate, xylulose 5-phosphate, glyceraldehyde 3-phosphate, sedoheptulose 7-phosphate and hexose monophosphate was obtained. Apparently extracts of L. torminosus dissimilate glucose via the pentose-phosphate pathway.

1284 PHYLOGENY OF PHOSPHOMANNAN-PRODUCING YEASTS. I. THE GENERA.
Lynferd J. Wickerham and Kermit A. Burton.
J. Bacteriol. 82(2): 265-268. August 1961.

Primitive yeasts of the genera Hansenula, Pichia, and Pachysolen produce extracellular phosphorylated mannans. The phosphomannans cause adherence of the cells to bark beetles that transport the yeasts from the sap-conducting tissues of one tree to another. Two yeasts that produce phosphomannans most abundantly are the most primitive species of Hansenula; H. holstii is heterothallic, and H. capsulata is homothallic. From these two species issued lines of species developing toward independence from trees as their habitat, and other lines that developed toward greater dependence upon trees. Almost all the primitive species of Pichia are very similar to those species of Hansenula that are highly dependent upon trees. The one available species of Pachysolen resembles species of the less dependent lines.

1285 PHYLOGENY OF PHOSPHOMANNAN-PRODUCING YEASTS. II. PHOSPHOMANNAN PROPERTIES AND TAXONOMIC RELATIONSHIPS.
M. E. Slodki, Lynferd J. Wickerham, and M. C. Cadmus.
J. Bacteriol. 82(2): 269-274. August 1961.

Primitive species of yeasts belonging to the genus Hansenula and closely related genera produce extracellular phosphorylated mannans from glucose. These polysaccharides, called phosphomannans, contain mannose and mannose 6-phosphate as the only carbohydrate constituents. A comparative study of these phosphomannans yielded valuable phylogenetic information bearing on the yeasts that produce them. Strains of the same species elaborate similar phosphomannans. An inverse relationship was found between the evolutionary status of the organism and the degree of phosphorylation of its phosphomannan.

1283 SOYBEAN PHOSPHATASE. PURIFICATION AND PROPERTIES.
F. C. Mayer, R. E. Campbell, A. K. Smith, and L. L. McKinney.
Arch. Biochem. Biophys. 94(2): 301-307. August 1961.

A nonspecific acid phosphomonoesterase was concentrated 700-fold from defatted soybean meal. This phosphatase had optimum activity at pH 6.0 as determined with β-glycerophosphate. Our observations and those of others indicate the possibility that soybeans contain four different phosphatases.

1291 AMINO ACIDS IN SOYBEAN HULLS AND OIL MEAL FRACTIONS.
J. J. Rackis, R. L. Anderson, H. A. Sasame, A. K. Smith and C. H. VanEtten.
J. Agr. Food Chem. 9(5): 409-412. September-October 1961.

Amino acids were determined by ion-exchange chromatography on soybean hulls, dehulled soybean meal, isolated soybean protein, and the residue; on whey proteins obtained by isolation of the acid-precipitated protein; and on the hypocotyl and acid-precipitated

protein of the hypocotyl. Pretreatment of the meal and other fractions before colorimetric determination of tryptophan is described. Essential amino acid composition of soybean meal fractions varied considerably, indicating that biological values of the protein in these fractions also differ. Soybean hulls contain unusually large amounts of glycine and hydroxyproline. Dehulled meal and residue contained no hydroxyproline.

1301 POLYSACCHARIDE B-1459: A NEW HYDROCOLLOID POLYELECTROLYTE PRODUCED FROM GLUCOSE BY BACTERIAL FERMENTATION.
Allene Jeanes, J. E. Pittsley, and F. R. Senti.
J. Appl. Polymer Sci. 5(17): 519-526. September-October 1961.

Opportunities exist for carbohydrate polymers of domestic origin possessing novel combinations of useful properties combined with constancy of quality and supply. An exocellular polysaccharide synthesized from an abundant raw material, glucose, by Xanthomonas campestris NRRL B-1459 meets these requirements. This macromolecular polysaccharide, composed of D-mannose, D-glucose, D-glucuronic acid (as the potassium salt), and a small proportion of acetyl groups, can be produced on an industrial scale and is stable in storage. The polysaccharide forms homogeneous dispersions in water, which show plastic rheological properties and viscosity comparable with that of high-grade plant gums. The atypical insensitivity of solution viscosity to salt effects and to heat, especially when salt is present, are outstanding characteristics of practical significance.

1293 THE DETERMINATION OF RESIDUAL ALCOHOL IN DEFATTED ALCOHOL WASHED SOYBEAN FLAKES.
L. T. Black, L. D. Kirk, and G. C. Mustakas.
J. Am. Oil Chemists' Soc. 38(9): 483-485. September 1961.

A method is described for determination of residual alcohol in soybean flakes washed with aqueous alcohol and desolventized to prepare a high-protein food supplement. The amount of alcohol removed from the flakes by extraction with acetone is determined quantitatively by esterification with phthalic anhydride. An excess of reagent is required since water present in the sample causes a secondary reaction which consumes phthalic anhydride. This analysis has been applied to flakes containing from 0.2 to 10% methanol, ethanol, or isopropanol. Accuracy of the method was established by adding known amounts of the three alcohols to soybean flakes. A relative error of less than 1% was obtained with a standard derivation of 0.05%.

1292 BLAND UNDENATURED SOYBEAN FLAKES BY ALCOHOL WASHING AND FLASH DESOLVENTIZING.
G. C. Mustakas, L. D. Kirk, and E. L. Griffin, Jr.
J. Am. Oil Chemists' Soc. 38(9): 473-478. September 1961.

Conditions for removing the beany and bitter flavor from defatted soybean meal with ethanol and isopropanol were investigated. In the presence of alcohols, soybean protein is extremely sensitive to denaturation when temperature, moisture, and residence time are increased. If protein is to be isolated in good yield and quality, retention of the original, high water-solubility is important, and denaturation must be kept to a minimum.

Defatted soybean flakes were successfully debittered by countercurrent washing with aqueous alcohols on a pilot-plant scale, and the entrained solvent was recovered by flash desolventizing without excessive denaturation of protein. Effective debittering was obtained with 95% ethanol and 91% isopropanol, whereas satisfactory flavor was not obtained with absolute ethanol. The percent solubility of the nitrogenous compounds in the meal product (Nitrogen Solubility Index--NSI) was maintained at 68, or higher, regardless of the solvent system or conditions used when starting with 80 NSI defatted flakes. Residual alcohol in the desolventized products was reduced to 1-2% with the aqueous alcohol system and to

less than 1% for the absolute alcohol system. Lower residual values can be obtained by recycling the material through the desolventizing unit. The desolventizing system described is simple, low in cost, and should be useful in any process requiring rapid removal of solvent from residual solids where heat-sensitive constituents are present.

1299 MOLECULAR WEIGHTS OF WHEAT GLUTEN FRACTIONS.
R. W. Jones, G. E. Babcock, N. W. Taylor, and F. R. Senti.
Arch. Biochem. Biophys. 94(3): 483-488. September 1961.

Molecular weights of glutenin and gliadin fractions differing in electrophoretic mobility have been determined in an ultracentrifuge by using approach to sedimentation equilibrium. γ-Gliadin is homogeneous and has a molecular weight of 47,000. Although it contains four electrophoretic components, each has the same molecular weight. Glutenin is heterogeneous, has a weight-average molecular weight of 2-3 million, and contains small molecules (very approximately 50,000) as well as very large ones. The observed molecular weight is believed to be real; that is, it results from chemical bonds rather than physical aggregation.

1296 ORGANIC ACIDS OF BARLEY GRAIN.
J. S. Wall, L. C. Swango, D. Tessari, and R. J. Dimler.
Cereal Chem. 38(5): 407-422. September 1961.

The identity and amounts of organic acids contained in whole barley grain and in barley grain fractions were investigated, since they may play significant roles in germination and seed metabolism. Methods used included ion-exchange adsorption, ether extraction, paper chromatography, and an improved procedure for partition chromatography on silica gel. Almost all the organic acids in barley extracts were accounted for as malic, acetic, succinic, fumaric, malonia, α-ketoglutaric, lactic, citric, aconitic, and pyrrolidone carboxylic. The reported presence was confirmed by a number of phenolic acids contained in barley, including ferulic, vanillic, p-hydroxybenzoic, and p-coumaric.

1297 PREPARATION OF PURIFIED ZEIN BY ADSORPTION-DESORPTION.
E. M. Craine, Diane V. Freimuth, Joyce A. Boundy, and R. J. Dimler.
Cereal Chem. 38(5): 399-407. September 1961.

A procedure was developed for preparing colorless zein that retains good solubility in aqueous ethanol. Zein was preferentially adsorbed from 70% ethanol on a column of weak cation exchanger resin in the acid form and also was readily desorbed by salt in 70% ethanol. Isolation of the zein by slow precipitation from the aqueous ethanol through dialysis at 0° to 4° C. against water, followed by lyophilization, resulted in retention of good alcohol solubility. The nonhygroscopic, easily powdered product gives clear solutions in alcohol and merits consideration not only as a reference sample but also as a constituent of rations for animal feeding studies using zein.

1300 STARCH GEL ELECTROPHORESIS OF WHEAT GLUTEN PROTEINS WITH CONCENTRATED UREA.
J. H. Woychik, J. A. Boundy, and R. J. Dimler.
Arch. Biochem. Biophys. 94(3): 477-482. September 1961.

Starch gel electrophoresis using aluminum lactate buffer (pH 3.1) containing 3M urea demonstrated nine components in wheat gluten;

four were not previously detected by the Tiselius method. One component appears to be higher in molecular weight than others and fails to migrate in starch gels.

Gliadin was shown to be composed of eight components, whereas glutenin appeared to be identical with the high molecular weight alpha-1 component of whole gluten.

When examined in aluminum lactate buffer containing 3 M urea, the water-soluble protein fraction isolated from a gluten preparation was composed of at least nine electrophoretic components.

1289 TEMPERING AND DEGERMINATION FOR CORN DRY MILLING: A RESEARCH PROJECT FOR INDUSTRY.
O. L. Brekke, L. A. Weinecke, F. C. Wohlrabe, and E. L. Griffin, Jr.
Am. Miller 89(9): 14-17. September 1961.

A pilot-plant installation to study tempering and degerminating steps in corn dry milling is described, along with the procedure used to make experimental tests with a Beall degerminator and the method followed to fractionate and evaluate product streams. Laboratory evaluations gave results comparable to those obtained in commercial practice and circumvent any further tempering and milling.

Data from a typical run show that operation of a Beall degerminator without any perforated screens, as compared with four, reduced hourly throughput about two-thirds, released only about one-half as much germ, and gave somewhat less hull. The yields of fractions coarser than 25 mesh were comparable, and the -4+6 mesh grits were somewhat higher both in oil content and in checked grit count. Apparently in a Beall degerminator dehulling and degermination result largely from rotor action, and perforated screens have a secondary function. Increased hourly throughput obtained with perforated screens is necessary in commercial operation.

1304 ULTRACENTRIFUGAL DIFFERENCES IN SOYBEAN PROTEIN COMPOSITION.
W. J. Wolf, G. E. Babcock,and A. K. Smith.
Nature 191(4796): 1395-1396. September 30, 1961.

Analyses of proteins from several varieties of soybeans show that all contain 4 fractions having sedimentation constants of 2, 7, 11, and 15S. Marked differences in relative concentrations of the major fractions were observed between Japanese and U.S. varieties. Japanese soybeans contain more 7S fraction and less 11S than American beans.

1320 COUNTERCURRENT DISTRIBUTION.
C. R. Scholfield.
J. Am. Oil Chemists' Soc. 38(10): 562-565. October 1961.

The design and use of modern, glass, countercurrent distribution instruments are described. The fundamental, single withdrawal, and recycle procedures and the mathematical formulas associated with each are outlined. Applications to lipid analysis including fatty acids, methyl esters, triglycerides, monoglycerides, fatty acid oxidation products, phospholipids, and pigments are reviewed.

1307 DEUTERIUM EXCHANGE IN STARCHES AND AMYLOSE.
N. W. Taylor, H. F. Zobel, Milford White, and F. R. Senti.
J. Phys. Chem. 65(10): 1816-1820. October 1961.

Complete exchangeability of hydroxyl hydrogens with deuterium oxide was observed for defatted wheat starch, potato starch, high-amylose corn starch, acid hydrolyzates of amylose with both A and B X-ray patterns, a palmitic acid complex of amylose in helical configurations, and retrograded amylose preparations. Results indicate that the hydroxyls are accessible in the A, B, and helical crystal structures and that all or nearly all hydrogen bonds in starch are relatively weak. Incomplete exchange between deuterated wheat starch and liquid ethanol was ascribed to lack of penetration of the granule by ethanol.

1303 IDENTIFICATION OF A NEW, NATURALLY OCCURRING, STEAM-VOLATILE ISOTHIOCYANATE FROM LESQUERELLA LASIOCARPA SEED.
Melvin E. Daxenbichler, C. H. VanEtten, and Ivan A. Wolff.
J. Org. Chem. 26(10): 4168-4169. October 1961.

6-Methylthiohexyl isothiocyanate was identified as a steam-volatile product from the seed of Lesquerella lasiocarpa by characterization as its thioures derivative. The isothiocyanate, present as 1.2% of the oil-free seed meal, was formed from the assumed parent glucoside by enzymatic hydrolysis. The name glucolesquerellin is suggested for the parent glucoside.

1316 THE PREPARATION AND PROPERTIES OF POLYOXYETHYLENE METHYL GLUCOSIDE FATTY ESTERS.
F. H. Otey, T. E. Yeates, C. L. Mehltretter, and C. E. Rist.
J. Am. Oil Chemists' Soc. 38(10): 517-520. October 1961.

New, nonionic, emulsifying agents--the polyoxyethylated methyl glucoside esters of some saturated and unsaturated fatty acids--are described. One series (Type A) was prepared by etherification of the glucoside esters. In another (Type B) the ethers of methyl glucoside were esterified.

In general, the esters exhibit good emulsifying action; the unsaturated esters, particularly Type B, also possess film-forming properties. Such compounds may have value in preparing emulsion paints. The surface tension of water is appreciably lowered by adding as little as 0.01% of the polyoxyethylene methyl glucoside esters.

1321 PRODUCTION OF LINOLENIC ACID FROM LINSEED OIL.
R. E. Beal, V. E. Sohns, R. A. Eisenhauer, and E. L. Griffin, Jr.
J. Am. Oil Chemists' Soc. 38(10): 524-527. October 1961.

Linolenic acid of more than 95% purity was produced by liquid-liquid extraction of linseed oil fatty acids with wet furfural and hexane in a special commercial centrifugal extractor. The minimum ratio of furfural to linseed acids to obtain this purity was 10 to 1. An estimate based on pilot-plant data indicates a "cost to make" (excluding administrative and selling expenses, profit, income

taxes, and interest on investment) of 18.0 cents per pound of 97% linolenic acid for a process which includes hydrolyzing linseed oil, separating the fatty acids by liquid-liquid extraction, recovering solvents by distillation, and distilling the fatty acid products. Potential uses for linolenic acid are reviewed.

1308 WATER SORPTION BY DEXTRANS AND WHEAT STARCH AT HIGH HUMIDITIES.
N. W. Taylor, J. E. Cluskey, and F. R. Senti.
J. Phys. Chem. 65(10): 1810-1816. October 1961.

Water absorption and desorption isotherms of amorphous dextran, partially crystallized dextran, and wheat starch were determined at relative humidities between 74 and 99.7%. Water sorption of NRRL B-512 dextran was followed before, during, and after crystallization. Results, interpreted according to the Flory-Huggins polymer solution theory, indicate that at water contents of 33% and higher, the amorphous dextrans behave as randomly coiled polymers in solution, apparently free of complications due to physical structure. The water absorptions of the partially crystallized dextran, and also of the starch, were interpreted by comparison with amorphous dextrans in terms of current concept of effects of crystallinity and elastic network.

1315 MONITORING ELUATES FROM CHROMATOGRAPHY AND COUNTERCURRENT DISTRIBUTION FOR RADIOACTIVITY.
H. J. Dutton.
J. Am. Oil Chemists' Soc. 38(11): 631-636. November 1961.

A review of methods for monitoring eluates containing C^{14} and H^3 labeled compounds as provided by countercurrent distribution, liquid-liquid chromatography, and gas-liquid chromatography.

1306 THE ALLEGED "THIAMINE-DESTROYING FACTOR" IN SOYBEANS.
F. B. Weakley, A. C. Eldridge, and L. L. McKinney.
J. Agr. Food Chem. 9(6): 435-439. November-December 1961.

The thiochrome method of Bhagvat and a modified Johnson procedure gave a poor recovery of added thiamine when used to assay untoasted soybean oil meal. The loss of thiamine, apparently greatest at pH 6-7 results from a metal-catalyzed oxidation. This reaction involves thiamine and requires the simultaneous presence of untoasted soybean oil meal and crude phosphatase-containing enzyme preparations in pH ranges 6-7.

Studies showed that thiamine in soybean oil meal exists as 40% free and 60% bound, presumably as the diphosphate ester. Enzymes in unheated meal readily convert known cocarboxylase to the free form of thiamine.

1312 HYDROXYPROLINE CONTENT OF SEED MEALS AND DISTRIBUTION OF THE AMINO ACID IN KERNEL, SEED COAT, AND PERICARP.
C. H. VanEtten, R. W. Miller, F. R. Earle, I. A. Wolff, and Quentin Jones.[1] ([1]USDA Crops Research Div., Beltsville, Md.)
J. Agr. Food Chem. 9(6): 433-435. November-December 1961.

Hydroxyproline was found in 63 of 99 samples of solvent-extracted, acid-hydrolyzed seed meals obtained from a wide variety of plants in amounts ranging from 0.1 to 5.7 grams per 16 grams of nitrogen. Eleven seed meals derived from the kernel alone contained no hydroxyproline. Eight samples of only seedcoat or pericarp from 7 plant families had hydroxyproline contents ranging from 3.1 to 10.0 grams per 16 grams of nitrogen. L-hydroxyproline was isolated from the seedcoat of Iris germanica and its identity established by classical methods. Limited solubility studies indicate that the compound is a part of the protein in seedcoat and pericarp. The implications of the presence of L-hydroxyproline as a part of these tissues are briefly discussed.

1305 MICROBIOLOGICAL PRODUCTION OF CAROTENOIDS. STABILIZATION OF β-CAROTENE IN DRIED FERMENTATION SOLIDS.
Alex Ciegler, George E. N. Nelson, and Harlow H. Hall.
J. Agr. Food Chem. 9(6): 447-451. November-December 1961.

Storage tests were conducted on the stabilization of carotene produced intracellularly by mated cultures of the mold, Blakeslea trispora. Addition of 0.25% Santoquin either to the medium during fermentation or to the dried product effectively stabilized carotene. Replacement of white grease with vegetable oil in the fermentation medium resulted in a more stable product in non-protected solids. Effective stabilization was also achieved by suspending dried mycelium in vegetable oil, by storage under inert atmospheres, or in high vacuum. Addition of a chelating agent or incorporation of dried mycelium in gelatin or casein did not increase stability.

1327 ALKALINE CLEAVAGE OF A HOMOLOG OF RICINOLEIC ACID.
M. O. Bagby.
J. Org. Chem. 26(11): 4735-4737. November 1961.

The major fatty acid of Lesquerella lasiocarpa seed oil, 14-hydroxy-cis-11-eicosenoic acid (lesquerolic acid), was heated at 270-300° C. with an excess of sodium hydroxide, yielding 2-octanol and dodecanedioic acid as the principal products. These cleavage products confirm the structure reported for lesquerolic acid and indicate one probable area of utility of the new acid for the preparation of chemical intermediates.

1331 AUTOXIDATION OF METHYL LINOLENATE. ISOLATION AND CHARACTERIZATION OF HYDROPEROXIDES.
E. N. Frankel, C. D. Evans, D. G. McConnell, E. Selke, and H. J. Dutton.
J. Org. Chem. 26(11): 4663-4669. November 1961.

Relatively pure hydroperoxides (I) were isolated by liquid partition chromatography and countercurrent distribution from methyl linolenate autoxidized at 37° C. Yields were from 30 to 36% of the oxygen absorbed. I was monomeric, had three double bonds, and had a conjugated diene system with predominantly cis,trans and a little

trans,trans configuration. Reduction of I gave conjugated diene hydroxylinolenate (II) which on acid dehydration yielded the conjugated methyl octadecatetraenoic ester (III). Catalytic hydrogenation of I gave a mixture of methyl 9-, 12-, 13-, and 16-hydroxystearate (IVa, b, c, d). The location of the hydroxyl was determined by boric acid dehydration of IV and by oxidative splitting of the resulting monoenoic esters (V). It is concluded that I is a mixture of methyl 9-, 12-, 13-, 16-hydroperoxy-octadecatrienoate with unsaturation in the 10,12,15; 9,13,15; and 9,11,15; and 9,12,14 positions, respectively.

1324 DETERMINATION OF MOLECULAR WEIGHTS OF CHARGED POLYMERS FROM EQUILIBRIUM ULTRACENTRIFUGATIONS.
Stig R. Erlander.
J. Phys. Chem. 65(11): 2033-2039. November 1961.

Equations for determining the weight- and Z-average molecular weights of charged polymers are derived. The results indicate that the concentration dependence of charged or uncharged polymers is a function of the concentration coefficient term B, the weight-average molecular weight, and the concentration of the polymer where all are obtained at both the meniscus and bottom of the centrifuge cell. The equations have been applied to schlieren and interference optical systems.

1302 HYDROGENATION OF LINOLENATE. COMPARISON OF PRODUCTS FROM TRILINOLENIN AND METHYL LINOLENATE BY USE OF COUNTERCURRENT DISTRIBUTION AND GAS-LIQUID CHROMATOGRAPHY.
C. R. Scholfield, E. P. Jones, and H. J. Dutton.
Anal. Chem. 33(12): 1745-1748. November 1961.

Kinetics for consecutive reactions of octadecatrienoate to octadecadienoate to octadeconoate have been studied with the aid of radioisotopic tracers and gas chromatography. Evidence for a triene to monoene shunt has been obtained. Similarly, the chemical reduction with hydrazine has been studied, but no evidence for this anomalous behavior was obtained. Methods to determine reaction rates from these kinetic measurements are discussed.

1314 INDONESIAN FERMENTED FOODS.
Ko Swan Djien and C. W. Hesseltine.
Soybean Dig. 22(1): 14-15. November 1961.

Investigations are being carried out at the Northern Laboratory on the species and strains of Rhizopus which have proved to make good tempeh. These investigations include story of the carbon and nitrogen sources, especially various forms and fractions of soybeans, which the tempeh molds can use or convert. The types of enzymes, especially proteases, lipases and amylases, as well as organic acids and other products present in the Rhizopus cultures were also studied. Because optimum temperature for tempeh fermentation of soybeans is important, the best range for growth was established as 25° to 40° C. At 32° C. tempeh may be made in a period of 20 hours with certain cultures. Batches of tempeh were made from U.S.

soybeans, especially Hawkeye, not only from the dehulled beans but also from beans which had seedcoats removed and cotyledons cracked into several pieces.

If sufficient basic information can be developed on making tempeh, this nutritious and delicious food might be introduced into countries where good protein foods are desperately needed and, in turn, the development might promote the export of U.S. soybeans. At present Indonesia grows all the soybeans consumed there.

1329 * LINSEED OIL EMULSION PAINTS: PROGRESS DURING 1960-61 AT THE NORTHERN REGIONAL RESEARCH LABORATORY.
J. C. Cowan.
Proc. 31st Annual Flax Inst. U.S., Minneapolis, Minnesota, pp. 33-35, November 10, 1961.

In order for linseed oil paints to compete successfully in today's market with synthetic emulsion paints, a suitable linseed oil emulsion for paints must be offered. The new approaches, new paint compositions, and new information developed at the Northern Laboratory for this purpose are reviewed.

1318 MASS SPECTROMETRY AND LIPID RESEARCH.
E. Selke, C. R. Scholfield, C. D. Evans, and H. J. Dutton.
J. Am. Oil Chemists' Soc. 38(11): 614-615. November 1961.

Preliminary results demonstrate the applicability of advances in equipment for mass spectrometry to problems of determining the position of double bonds in monoenes and of identifying volatiles from reverted soybean oil.

1330 MISO. III. PURE CULTURE FERMENTATION WITH SACCHAROMYCES ROUXII.
C. W. Hesseltine and K. Shibasaki.
Appl. Microbiol. 9(6): 515-518. November 1961.

Excellent miso was prepared with soybean grits inoculated with a pure culture of Saccharomyces rouxii NRRL Y-2547. Pure culture inoculum of this osmophilic yeast was prepared by growing the culture in aerated flasks on a yeast extract medium with a salt concentration equal to that used in the manufacture of miso--a traditional Japanese food. It was also possible to make miso from whole beans with this culture. The advantages of pure culture fermentation in producing miso are discussed.

1328 SEPARATION OF GEOMETRIC ISOMERS AND ISOLOGUES OF FATTY ACID ESTERS BY COUNTERCURRENT DISTRIBUTION.
H. J. Dutton, C. R. Scholfield, and E. P. Jones.
Chem. & Ind. (London) (46): 1874-1876. November 18, 1961.

The efficacy of the silver complexing system in countercurrent distribution is demonstrated for the separation of geometric isomers and isologues of fatty acid esters.

1317 SOME APPLICATIONS OF MASS SPECTROMETRY TO LIPID RESEARCH.
Herbert J. Dutton.
J. Am. Oil Chemists' Soc. 38(11): 660-664. November 1961.

This paper reviews recent applications of mass spectrometry to lipids and projects possible future applications. Since an excellent review emphasizing structural applications to mass spectrometry in lipid research by foremost contributors to the field has recently appeared, this topic is given only cursory treatment and recent applications complementary to those already reviewed are included.

1309 URETHANE FOAMS FROM METHYL GLUCOSIDE POLYETHERS.
T. E. Yeates and C. L. Mehltretter.
Modern Plastics 39(3): 151, 225. November 1961.

The crystalline acetal, methyl glucoside, readily derived from corn starch by methanolysis, has the physical properties and chemical structure suitable for conversion to polyethers. Urethane foams of possible utility may be prepared from polyethers of methyl glucoside and diisocyanate. Melted methyl glucoside has been reacted with ethylene oxide to yield a variety of polyoxyethylene derivatives, which were crosslinked and expanded with tolylene diisocyanate to produce rigid, semirigid, and flexible foams.

1319 CHARACTERIZATION OF CYCLOPROPENOID ACIDS IN SELECTED SEED OILS.
T. L. Wilson, C. R. Smith, Jr., and K. L. Mikolajczak.
J. Am. Oil Chemists' Soc. 38(12): 696-699. December 1961.

It has not been generally recognized that sterculic and malvalic acids occur in the same seed oils. Sterculia foetida oil contains 54.4% sterculic and 6.7% malvelic acids; Hibiscus syriacus oil contains 16.3% malvalic and 3.4% sterculic; and Lavatera trimestris oil contains 7.7% malvalic and 0.6% sterculic acids. Hibiscus syriacus oil also contains 1.5% dihydrosterculic acid. The cyclopropenoid acids were characterized by hydrogenation in conjunction with gas-liquid chromatography and by oxidation to β-dioxo acids with subsequent cleavage with peracetic acid. Acetolysis of epoxides in the presence of cyclopropenes was effected by room temperature treatment with acetic acid-10% sulfuric acid (5:2).

1332 EVALUATION OF SEED GALACTOMANNANS FROM LEGUMES AS PAPER SIZES.
H. L. Tookey, A. J. Ernst, R. L. Lohmar, and I. A. Wolff.
TAPPI 44(12): 910-912. December 1961.

Seed galactomannans from Crotalaria intermedia, C. spectabilis, Cassia emarginata, Trigonella foenum-graecum, and Melilotus indica were tested as wet-end additives for softwood kraft and sulfite pulps. The first three were generally equivalent to commercial guar gum in improving burst, tensile, and fold properties of handsheets. The Trigonella and Melilotus mucilages improved the strength characteristics of handsheets but were not as effective as guar gum. All the galactomannans tested as surface sizes were as effective as guar or locust bean gums in improving strength characteristics of a commercial coating base.

1313 RESEARCH PROGRESS IN SOYBEAN UTILIZATION 1959-61.
J. C. Cowan and W. C. Witham.
Soybean Dig. 22(2): 12-14, 16. December 1961.

Progress in research on soybean oil and meal at the Northern Laboratory is reviewed for the past 3 years. Under flavor stability of the oil are discussed autoxidation, dimer content, oxidative cleavage products, hydrogenation, and unsaponifiables. Under meal investigations are discussed essential amino acids, foams, and gels. A new chemical from soybean oil, called aldehyde oils, is described.

1322 SEARCH FOR NEW INDUSTRIAL OILS. V. OILS OF CRUCIFERAE.
K. L. Mikolajczak, T. K. Miwa, F. R. Earle, I. A. Wolff, and Quentin Jones.[1] ([1]USDA Crops Research Div., Beltsville, Md.)
J. Am. Oil Chemists' Soc. 38(12): 678-681. December 1961.

Seeds from 37 species of plants in the family Cruciferae were analyzed for oil and protein, and the fatty acid composition of the oils was determined by gas-liquid chromatography. Erucic acid, generally considered characteristic of crucifer oils, occurs in about three-fourths of these species in amounts ranging from 3 to 59%. Some oils free of erucic acid contain up to 63% linolenic acid or up to 58% eicosenoic.

378 ORIENTAL METHODS OF USING SOYBEANS AS FOOD. WITH SPECIAL ATTENTION TO FERMENTED PRODUCTS AND NOTES ON ORIENTAL FARMING PRACTICES.
Allan K. Smith.
North. Util. Res. Devlpmt. Div., Agr. Res. Serv., U.S. Dept. Agr. ARS-71-17, 65 pp., July 1961. (Processed).

The text of this bulletin, with slight revisions, appeared serially in THE SOYBEAN DIGEST, issues of February through June 1949, although many additional illustrations appear herein. This bulletin was first processed as AIC-234 and issued June 1949. It was reprinted again in June 1951. Later information on "Use of United States Soybeans in Japan" will be found in ARS-71-12.

CONTRACT RESEARCH PUBLICATIONS

[Report of research work done by an outside agency under contract with the U.S. Department of Agriculture and supervised by the Northern Utilization Research and Development Division of the Agricultural Research Service.]

99-C A METHOD FOR THE DETERMINATION OF RELATIVE AMOUNTS OF MALTED-WHEAT, FUNGAL (ASPERGILLUS ORYZAE) AND BACTERIAL (BACILLUS SUBTILIS) ALPHA-AMYLASE IN MIXTURES, AND ITS APPLICATION TO MALTED WHEAT.
James R. Fleming, Byron S. Miller, and John A. Johnson, Kansas State University, Manhattan.
Cereal Chem. 38(6): 479-486. November 1961.

[Report of research work supported with funds provided by the U.S. Department of Agriculture under the authority of U.S. Public Law 480, 83rd Congress, and sponsored by the Northern Utilization Research and Development Division.]

4-PL-480 POLYAMIDES CONTAINING ISOPROPYLIDENE SUGAR RESIDUES.
T. P. Bird, W. A. P. Black, E. T. Dewar, and J. B. Hare.
Arthur D. Little Research Institute
Inveresk, Musselburgh, Midlothian, England.
Chem. & Ind. (London) (28): 1077. July 1961.

6-PL-480 THE DETERMINATION OF SMALL CONCENTRATIONS OF CARBONYL GROUPS IN STARCH BY THE CYANOHYDRIN METHOD.
Justin Schmorak and Menachem Lewin.
Institute for Fibres and Forest Products Research
Ministry of Commerce and Industry
Jerusalem, Israel.
Anal. Chem. 33(10): 1403-1405. September 1961.

8-PL-480 ISOLATION OF A NEW ANTIOXIDANT FROM OATS.
D. G. H. Daniels and H. F. Martin.
Research Association of British Flour Millers
Cereals Research Station
Old London Road, St. Albans, Herts, England.
Nature 191(4795): 1302. September 23, 1961.

5-PL-480 THE DETERMINATION OF SMALL AMOUNTS OF CARBONYL GROUPS IN STARCH BY THE CYANOHYDRIN METHOD.
J. Schmorak and M. Lewin.
Institute for Fibres and Forest Products Research
Ministry of Commerce and Industry
Jerusalem, Israel.
Bull. Research Council Israel, Sect. 10A(3): 22. September 1961.

7-PL-480 AN APPROXIMATE DETERMINATION OF NUMBER AVERAGE DP OF AMYLOSE AND AMYLOPECTIN IN DEGRADED STARCH WITHOUT RECOURSE TO FRACTIONATION.
J. Schmorak, D. Majzler and M. Lewin.
Institute for Fibres and Forest Products Research
Ministry of Commerce and Industry
Jerusalem, Israel.
Bull. Research Council Israel, Sect. 10A(3): 21. September 1961.

11-PL-480 SEDIMENTATION OF β-LACTOGLOBULIN (A,B) UNDER DISSOCIATING CONDITIONS IN ACID SOLUTION.
Lilo M. Gilbert and G. A. Gilbert.
University of Birmingham
Birmingham, England.
Nature 192(4808): 1181. December 23, 1961

**ADD TO ARS-71-3, SUPPLEMENT 14

9-PL-480 A MODIFIED RECORDING OXYGEN ABSORPTION APPARATUS FOR THE DETERMINATION OF OXIDATIVE STABILITY OF LIPID MATERIAL.
H. F. Martin.
The Research Association of British Flour Millers
Cereals Research Station
St. Albans, Herts, England.
Chem. & Ind. (London) (12): 364-367. March 25, 1961.

**Notice of publication omitted from this issue.

PATENTS

[These patents are assigned to the Secretary of Agriculture. Copies of patents may be purchased from the U.S. Patent Office, Washington 25, D.C.]

GLUCOSE-AMINE SEQUESTRANTS.
John E. Hodge and Ben F. Moy.
U.S. Patent 2,996,449. August 15, 1961.

Glucosylamines (D-glucosylamine and di-D-glucosylamine) and their respective Amadori rearrangement products, 1-amino-1-deoxy-D-fructose and especially imino-bis(1-deoxy-D-fructose) have been found to be effective chelating agents for calcium, copper, iron, and zinc ions. A preponderance rather than a minor proportion of the di-D-glucosylamine is formed by reacting glucose at atmospheric pressure in methanolic ammonia or liquid ammonia containing also an acidic salt catalyst and an anhydrous water-binding sulfate salt, first at below 40° C. and then at 60-70° C. to drive off ammonia. The Amadori rearrangement product salts are obtained by warming the ethyl acetate-precipitated mono- and di-glucosylamines in glacial acetic acid.

VACUUM-ASSISTED METHOD OF TEMPERING CORN.
Laurence A. Weinecke and Ordean L. Brekke.
U.S. Patent No. 2,996,385. August 15, 1961.

The tempering of stored corn for milling is accomplished by applying a vacuum corresponding to at least 1 inch of mercury (preferably 5 inches) during a water-treatment stage that is shortened to 30-60 seconds.

METHOD OF PRODUCING AN ATYPICALLY SALT-RESPONSIVE ALKALI-DEACETYLATED POLYSACCHARIDE.
Allene R. Jeanes and James H. Sloneker.
U.S. Patent 3,000,790. September 19, 1961.

Polysaccharide B-1459 obtained from an aerobic whole culture fermentation of Xanthomonas campestris NRRL B-1459 is substantially deacetylated by alkali. Solutions of the substantially deacetylated polymer show atypical increases rather than decreases in viscosity in the presence of salts and form superior glycerol-plasticized films.

METHOD OF PRODUCING MANNOSE-6-PHOSPHATE.
Morey E. Slodki.
U.S. Patent No. 3,002,966. October 3, 1961.

Mannose-6-phosphate is obtained by acid hydrolysis (75 minutes; 100° C.) of a phosphomannan obtained from a whole culture aerobic fermentation of a member selected from the group of yeasts consisting of Hansenula capsulata NRRL Y-1889, H. capsulata NRRL Y-1882, H. holstii NRRL Y-2154, H. holstii NRRL Y-2448, H. minuta NRRL Y-411, Pachysolens tannophilus NRRL Y-2461, Torulopsis pinus NRRL Y-2023, and Saccharomyces pini NRRL YB-2022, the hydrolysate then being treated with $Ba(AOc)_2$ and precipitated as the barium salt of mannose-6-phosphate with methanol, and converted to mannose-6-phosphate with an H^+ form cation exchanger.

PROCESS FOR PREPARING PHOSPHORIC ACID MONOESTERS OF MANNOSE POLYMERS.
Morey E. Slodki.
U.S. Patent 3,002,967. October 3, 1961.

A dispersant composition comprising phosphoric acid monoesters of phosphomannan is prepared by H^+ cation exchange treatment of a phosphomannan obtained from an aerobic whole culture fermentation of a member selected from the group of yeasts consisting of Hansenula capsulata NRRL Y-1889, H. capsulata NRRL Y-1882, H. holstii NRRL Y-2154, H. holstii NRRL Y-2448, H. minuta NRRL Y-411, Pachysolens tannophilus NRRL Y-2461, Torulopsis pinus NRRL Y-2023, and Saccharomyces pini NRRL YB-2022 and heating the pyrophosphoric acid form so formed at 100° C. for 20 minutes to permit autohydrolysis to the phosphoric acid monoester form.

METHOD OF PREPARING MONOMERIC CYCLIC UNSATURATED ACIDS.
Robert E. Beal.
U.S. Patent 3,005,840. October 24, 1961.

Increasing yields of monomeric cyclic unsaturated acids are obtained in the extended high-temperature treatment of polyunsaturated vegetable oils or acids thereof with excess alkali in a glycol solvent if ethylene at 45 p.s.i. pressure is added when the original nitrogen pressure reaches a value of about 25 p.s.i.

METHOD OF OBTAINING SUBSTANTIALLY PURE GLUCURONIC ACID LACTONE.
Charles L. Mehltretter.
U.S. Patent 3,012,041. December 5, 1961.

Substantially pure glucuronic acid lactone is obtained from a mother liquor containing the sodium or ammonium salt of 1,2-cyclohexylidene gluconic acid by adding calcium chloride solution to form the easily precipitatable calcium salt, reacting the latter with sulfuric acid thereby precipitating the calcium ion, and evaporating the filtrate to obtain free 1,2-cyclohexylidene glucuronic acid lactone which upon treating in water hydrolyzes to liberate glucuronic acid.

SYNTHETIC COCOA BUTTER SUBSTITUTE.
Herbert J. Dutton and Charles R. Scholfield.
U.S. Patent 3,012,890. December 12, 1961.

A synthetic cocoa butter was prepared by reacting tripalmitin, tristearin, and triacetin with glycerol in the presence of sodium methoxide, obtaining diglyceride crystals by slow cooling, and reacting said crystals with oleyl chloride.

METHOD OF PREPARING A DRYING OIL AND ALKYL ESTERS OF ALL-TRANS-8,10,12-OCTADECATRIENOIC ACID.
Cecil R. Smith, Jr., Curtis A. Glass, and Ivan A. Wolff.
U.S. Patent 3,013,037. December 12, 1961.

The 9-hydroxy-trans,trans-10,12-octadecatrienoic acid (dimorphecolic acid) constitutent of Dimorphoteca oil was dehydrated to all-trans-8,10,12-octadecatrienoic acid by glacial acetic acid or 0.2% p-toluene-sulfonic acid to give a superior drying oil. Methyl ester intermediates of Dimorphoteca oil, dimorphecolic acid, and dehydrated dimorphecolic acid were also prepared.

Similar lists of publication abstracts and patents are available from the other three Regional Utilization Research and Development Divisions of the Agricultural Research Service, U.S. Department of Agriculture. The addresses and fields of research covered are:

Division	Principal Fields of Research
Eastern Utilization Research and Development Division 600 East Mermaid Lane Philadelphia 18, Pennsylvania	Animal products: dairy, meat, fats, and leather; plant products: Eastern fruits and vegetables, tobacco, honey, maple, and new crops; and allergen studies.
Southern Utilization Research and Development Division Post Office Box 19687 New Orleans 19, Louisiana	Cotton and cottonseed; tung fruit; pine gum; Southern fruits and vegetables, including citric, sweetpotatoes, and cucumbers; sugarcane; rice; peanuts; and new crops.
Western Utilization Research and Development Division 800 Buchanan Street Albany 10, California	Western fruits, nuts, vegetables, and rice; poultry products; forage crops; wheat and barley; wool and mohair; sugar beets; dry beans and peas; castor beans; and new crops.